

REPORT ON A COLLECTION OF BETHYLIDAE (HYMENOPTERA) FROM CENTRAL FLORIDA

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Abstract.—About 3200 specimens representing 51 species of Bethylidae were taken, primarily in Malaise traps, at 5 sites in Orange Co., and one site in Seminole Co., Florida. These are listed, with habitats and dates of collection. One new species is described: *Bakeriella mira* Evans. Range extensions are indicated for four species, and one new synonymy is made.

Key Words: Hymenoptera, Bethylidae, wasps, Florida

Beginning in 1990, biologists at the University of Central Florida (UCF) have surveyed the arthropod fauna of the campus, using Malaise traps and a variety of other sampling techniques. The university was founded in 1963 on an 1100 acre plot of land that had previously been a cattle ranch. Malaise traps were set up in four ecologically distinct sites on campus and were maintained throughout the year, being emptied every 4-5 days. Specimens were collected in cyanide prior to 1995, in that year and 1996 in 70% isopropyl alcohol. Traps were of the design of Townes (1972) with some modifications. Fine-meshed cloth was used, in some cases all black, in others black and white. Two Malaise traps were also set up outside the campus, one at Rock Springs Run State Reserve, 40 km NW of the UCF campus, and one at the home of SMF in Oviedo, 9 km N of the campus. The last locality is in Seminole Co., the others in Orange Co.

A report on the Bethylidae seems justified because of the large number of specimens taken (3200) and the diversity of the fauna (51 species). Some species occurred

in remarkable numbers, for example 817 males and 9 females of *Pseudisobranchium flaviventre* (Kieffer). Such figures suggest that some Bethylidae are much more plentiful than commonly realized. To the best of our knowledge, no species of *Pseudisobranchium* has ever been reared from a host. Females have been found in ant nests, but it is uncertain whether they attack the larvae of ants or of their beetle myrmecophiles. Clearly there is much room for research.

The collection includes one previously undescribed species and four range extensions, two of them unexpected reports of species of more tropical distribution. One new synonymy is made on the basis of series of males and females formerly assigned to different species.

COLLECTION SITES

The collection sites are referred to by number in the list that follows.

1. A disturbed area of long leaf and slash pine (*Pinus palustris* Mill. and *P. elliottii* Engelm.), turkey oak (*Quercus laevis* Walter), and saw palmetto (*Serenoa repens*

(Bartr.). This site has not been burned for many years and now bears many sand pines, *Pinus clausa* (Engelm.) Sarg. UCF campus.

2. A scrub growing on fossil sand dunes with vegetation that includes sand pine, Florida rosemary (*Ceratiola ericoides* Michx.), saw palmetto, and scrub oaks (*Quercus geminata* Small, *Q. myrtifolia* Willd., and *Q. chapmani* Sargent, in order of abundance), and lyonias, *Lyonia ferruginea* (Walt.) Nutt. and *L. lucida* (Lam.) Koch. UCF campus.

3. Cypress dome, consisting of pond cypress (*Taxodium ascendens* Brogn.), maidencane (*Panicum hemitomom* Schultes), wax myrtle (*Myrica cerifera* L.), dahoon holly (*Ilex cassine* L.), and gallberry (*Ilex glabra* L.). The trap was about 3 m out in the water at the middle of the cypress ring. UCF campus.

4. Site near a nyssa pond (*Nyssa sylvatica* Marsh) that was wet for a large part of the year; an area adjacent to the site has since been developed as a retention pond. Vegetation consists of long leaf and slash pine, saw palmetto, shining lyonia, *Lyonia lucida* (Lam.) Koch, and assorted grasses. UCF campus.

5. Rock Springs Run State Reserve. This is a 356 acre parcel of land that has not been burned within the last 40-50 years. Predominant vegetation is sand pine and sand live oak (*Quercus geminata* Small), with a secondary mixture of myrtle oak (*Q. myrtifolia* Willd.), Chapman's oak (*Q. chapmani* Sargent), saw palmetto, and Florida rosemary.

6. A rural yard in an older neighborhood of Oviedo. One side of the trap faced a moderately cultivated yard, with weeds and a mixture of native and exotic plants; the other side faced an abandoned field that was once a citrus orchard.

LIST OF SPECIES

Listing of genera follows Evans (1978), with species of each genus listed alphabetically.

SUBFAMILY PRISTOCERINAE

- Pristocera armifera* (Say). 7 ♀♀, 87 ♂♂. May–Dec. Sites 1, 2, 4.
P. atra Klug. 2 ♀♀, 218 ♂♂. Throughout the year. Sites 1, 2, 5.
P. bridwelli Evans. 1 ♂. June. Site 1. New record for Florida.
P. fraterna Evans. 7 ♀♀, 142 ♂♂. Throughout the year, all sites.
Apenesia parapolita (Evans). 2 ♀♀, 30 ♂♂. Throughout the year. Sites 1, 2, 5.
Dissomphalus apertus Kieffer. 21 ♂♂. May–Sept. Sites 3, 4.
D. barberi Evans. 1 ♂. Oct. Site 6. New record for Florida.
D. kansanus Evans. 1 ♂. Oct. Site 1.
Pseudisobrachium arenarium Evans. 807 ♂♂. Throughout the year. Sites 1, 2, 5, 6. See note below.
P. ashmeadi Evans. 73 ♂♂. Jan.–Feb., June–Dec. Sites 1, 2, 4, 5, 6.
P. carolinianum Evans. 59 ♂♂. Jan., June–Nov. Site 5.
P. flaviventre (Kieffer). 9 ♀♀, 817 ♂♂. Throughout the year. Sites 1, 2, 4, 6. See note below.
P. rufiventre (Ashmead). 49 ♂♂. Jan., Apr.–Dec. Sites 1, 2, 5, 6.

SUBFAMILY EPYRINAE

- Rhabdepyris amabilis* Fouts. 5 ♂♂. May–Aug. Sites 2, 4, 5.
R. carolinianus Evans. 8 ♀♀, 35 ♂♂. May–Sept. Sites 1, 2.
R. mellipes Evans. 1 ♀. May. Site 4.
R. muesebecki Evans. 3 ♂♂. June, July. Sites 1, 3.
Anisepyrus analis (Cresson). 59 ♀♀, 29 ♂♂. Jan.–Nov. Sites 1, 2, 4, 5, 6.
A. bradleyi (Evans). 1 ♀. July. Site 2.
A. columbianus (Ashmead). 6 ♀♀, 18 ♂♂. Jan., Apr.–Aug. Sites 1, 2, 5.
A. gibbosifrons Evans. 1 ♂. June. Site 6. Flight intercept trap.
A. grandis (Ashmead). 31 ♀♀, 210 ♂♂. Throughout the year. All six sites.
A. subviolaceus Kieffer. 1 ♀, 8 ♂♂. May–Aug. Sites 1, 2, 4, 5.

- Epyris alachua* Evans. 4 ♀♀. Mar., May, July. Sites 2, 6.
- E. deficiens* Krombein. 4 ♀♀, 20 ♂♂. Throughout the year. Sites 1, 2, 5.
- E. festivus* Evans. 29 ♀♀, 24 ♂♂. Throughout the year. Sites 1, 2, 3, 5. See note below.
- E. myrmecophilus* (Brues). 1 ♀, 13 ♂♂. Throughout the year. Sites 1, 2.
- E. oriplanus* Kieffer. 1 ♀, 2 ♂♂. May, July, Dec. Sites 1, 2.
- E. rufipes* (Say). 39 ♀♀, 182 ♂♂. Throughout the year. All six sites.
- E. spissus* Evans. 20 ♀♀, 6 ♂♂. Throughout the year. Sites 1, 2, 3.
- E. tricostatus* Evans. 1 ♀, 1 ♂. July, Aug. Sites 1, 2.
- Bakeriella mira* Evans, n. sp. described below. 2 ♂♂. June, July. Site 1.
- Holepyris floridanus* (Ashmead). 3 ♀♀, 18 ♂♂. Throughout the year. Sites 1, 2, 5, 6.
- H. graminis* Evans. 1 ♀, 7 ♂♂. Jan., June–Nov. Sites 1, 2, 4, 5, 6.
- H. hispaniolae* Evans. 3 ♀♀, 1 ♂. Apr.–July. Sites 1, 2, 5. Two ♀♀ taken in flight intercept trap. See note below.
- H. lautus* Evans. 1 ♀, 21 ♂♂. Throughout the year. Sites 1, 2, 4, 5, 6.
- H. micidus* Evans. 2 ♀♀, 9 ♂♂. May, July–Dec. Sites 1, 2, 6.
- H. subapterus* (Melander and Brues). 2 ♀♀. May. Site 2.
- H. subtilis* Evans. 1 ♀, 3 ♂♂. May, Aug., Sept. Sites 1, 2, 3. ♀ taken in flight intercept trap. See note below.
- Laelius centratus* (Say). 1 ♀. April. Site 6.
- Scleroderma macrogaster* (Ashmead). 3 ♀♀. Apr.–May. Site 6.

SUBFAMILY BETHYLINAE

- Prosierola bicarinata* (Brues). 1 ♀. July. Site 6.
- Goniozus columbianus* Ashmead. 1 ♀. Feb. Site 4.
- G. floridanus* (Ashmead). 1 ♀. Aug. Site 2.
- G. fratellus* Evans. 2 ♀♀. Mar., Oct. Site 2.
- G. hortorum* Brues. 3 ♀♀. Mar., May, Aug. Sites 1, 4.

- G. hubbardi* Howard. 6 ♀♀. Feb., Mar., June, Dec. Sites 1, 4, 6.
- G. indigenus* Evans. 5 ♀♀. May. Site 2. Flight intercept trap.
- G. nigrifemur* Ashmead. 10 ♀♀. Feb., Mar., May, Sept., Oct. Sites 1, 2, 3, 6.
- G. scitulus* Evans. 3 ♀♀. Apr., Aug., Oct. Sites 2, 6.
- G. seminole* Evans. 9 ♀♀. Jan., Feb., Apr., June–Nov. Sites 2, 4, 5.

NOTES AND DESCRIPTIONS OF INDIVIDUAL SPECIES

Pseudisobrachium arenarium Evans

This species is a member of the *prolongatum* group of Evans (1961), in which the mandibles of the male are 5-toothed, but the third and fourth teeth are very small and may be partially or even wholly fused, resulting in 4-toothed mandibles. Of the 807 males collected in this study, 233 (29%) have only four distinct mandibular teeth. These are mainly smaller males and are easily confused with *rufiventre*. However, in *arenarium* the minimum width of the frons barely if at all exceeds eye height and the antennae are more elongate, segment 3 being about twice as long as wide.

Pseudisobrachium flaviventre (Kieffer)

Correct association of the sexes in this genus is difficult, as males are commonly taken sweeping, in traps, or at light, while females are usually found in ant nests. In this case the 9 females may have been carried into malaise traps by males through phoretic copulation, as is known to occur in other *Pristocerinae*. These females are minute, varying in body length from 2 to 3 mm, in head length from 0.40 to 0.53 mm; length of the head varies from 1.25 to 1.42 times width of the head. This stands in contrast to the female *rufiventre*, in which the head is 0.68 to 0.8 mm long and 1.1 to 1.2 times as long as wide. The mandibles of the 9 *flaviventre* females are basically bidentate, but in 5 specimens a small knob basad of the uppermost tooth can be detected, and

in 2 a small third tooth is present. By and large, these specimens key well to *flaviventre* in the keys to females presented by Evans (1961, 1978).

Some of the characters previously used for identification of males have proved of doubtful reliability. The most useful feature for identifying male *flaviventre* is the compact, pale yellowish to reddish-brown antennae, in which the outer flagellar segments (except the last) are no longer than wide. In contrast, male *rufiventre* have brown antennae in which the outer flagellar segments are distinctly longer than wide.

Epyris festivus Evans

This is a member of the *depressigaster* group of Evans (1969), in which the abdomen of the female is strongly depressed and bears one or more hyaline plates ventrally. In characterizing the group, Evans suggested the possibility that members of the *idionotum* group might represent the male sex. Collection of 29 females of *festivus* and 24 males of *idionotum* at similar times and sites makes it clear that these are female and male of one species. While pronotal structure is very different, there is similarity in the dark olive-green coloration as well as in the 9 or 10 parallel propodeal carinae. This is a new synonymy, *festivus* having page priority over *idionotum*; both were described by Evans in 1969.

Bakeriella mira Evans, new species

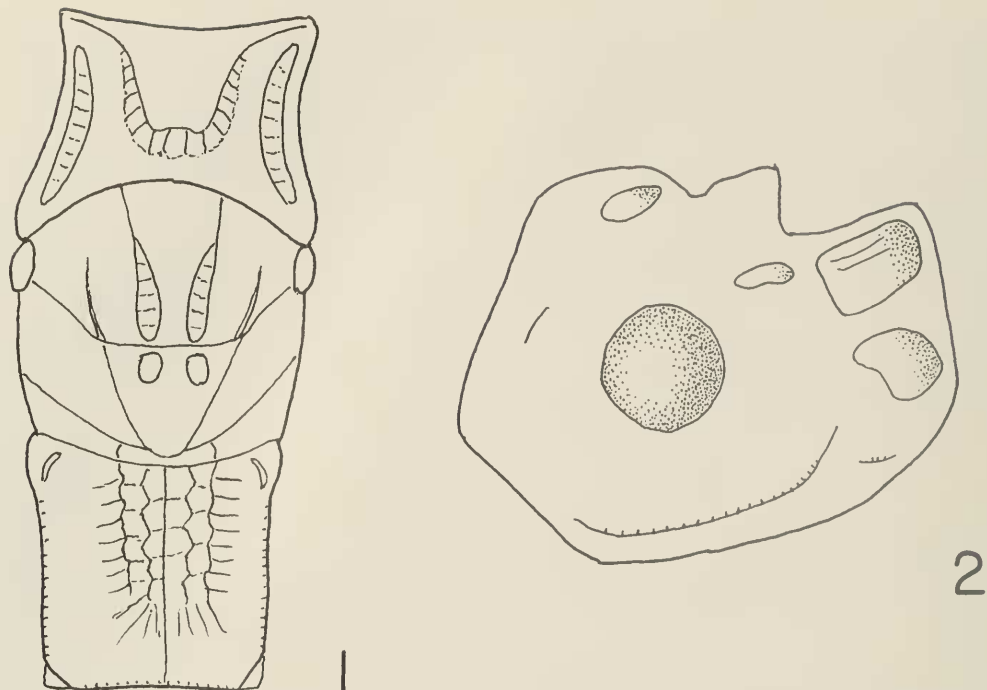
Holotype.—♂, FLORIDA: Orange Co., UCF, Orlando, VII-22-93; LLP-sand pine, turkey oak; Malaise trap, S.M. Fullerton collector (National Museum of Natural History, Smithsonian Institution). *Paratype*.—♂, same data except collected VI-7-96 (Florida State Collection of Arthropods).

Description of holotype male.—Length 4.2 mm, fore wing 2.7 mm. Black; antenna bright reddish-brown, apical two segments darkened; palpi light brown; mandible black basally, reddish apically; tegula light brown; coxae and mid and hind femora black, fore femur and all tibiae and tarsi

brown; wings hyaline. Median lobe of clypeus obtusely angulate; antennal scrobes not carinate; genae not carinate. Scape about twice as long as thick; first 4 antennal segments in a ratio of 17:7:7:10. Head about as wide as high; eyes weakly convergent below, not hairy; width of frons 0.58 times width of head, 1.10 times height of eye. Ocelli in a right triangle, ocello-ocular line subequal to width of ocellar triangle. Frons weakly shining, alutaceous, with small, setigerous punctures separated by somewhat more than their own diameters.

Thoracic dorsum similarly alutaceous and punctate, bearing short, brown hairs. Pronotum with anterior lateral angles sharp and slightly protuberant; lateral margins concave, paralleled internally by a foveolate groove; anterior margin of disc elevated, the elevation extended broadly backward, then slightly emarginate, margins of the elevation foveolate; posterior pronotal margin simple (Fig. 1). Mesoscutum with deeply impressed, somewhat foveolate notauli that are progressively more slender anteriorly, reaching the pronotum as thin lines. Scutellum flat, with two large pits separated by slightly less than their own diameters. Propodeal disc 1.15 times as wide as long, with a complete median carina flanked by 4 incomplete, more irregular carinae between which the surface is foveolate; sides of disc weakly transversely striate, posterior margin carinate. Mesopleurum with a large, bowl-shaped median pit and two smaller anterior pits; lower margin with a weakly foveolate longitudinal carina (Fig. 2).

Variation.—The paratype is slightly larger than the type, body length measuring 4.9 mm, fore wing 2.9 mm. Resemblance to the type is very close, but there are two minor differences in sculpturing: the scutellar pits are not quite as wide and are separated by approximately their greatest diameters; and there are only 3 well-defined propodeal carinae, the 2 irregular carinae close beside the median carina being less well formed than in the type.



Figs. 1, 2. *Bakeriella mira*, holotype. 1, Dorsal aspect of thorax and propodeum. 2, Lateral aspect of mesopleurum, anterior margin to the right. Figures not drawn to same scale.

Remarks.—This striking species is known from only two specimens. The form of the anterior elevation of the pronotum is unique in the genus. Well separated scutellar pits such as those in *mira* occur in only one other known species of *Bakeriella*, *cristata* Evans, known from Brazil, Bolivia, and Argentina (Evans, 1964, 1979). Only one other species of *Bakeriella* is known from the United States: *floridana* Evans, reported from Dade Co., Florida, also from Jamaica. This species differs in many details from *mira*: the scutellar pits are separated by a thin septum, the pronotum has a transverse carina across the front, and the mesopleurum lacks a large median depression.

Twenty-three species of this neotropical genus are now known. Evans (1979) provided a key for 18 of these. Azevedo (1991, 1994) has recently added three species of *Bakeriella* from Brazil and presented a key

to the 11 species having an anterior transverse carina on the pronotum.

Holepyris hispaniolae Evans

This species was described by Evans (1977) from a single female from Constanza, Dominican Republic. Three females from sites 2 and 5 agree very closely with the type and represent a notable range extension—not however without precedent, since *Bakeriella floridana* Evans and *Anisepyris aurichalceus* (Westwood) also occur both in Florida and in the West Indies. A male from site 1 almost certainly represents the previously unknown male of this species. In the key of Evans (1958) it runs to *floridanus* (Ashmead) but the prominently 5-carinate propodeum (similar to that of the female) and the broader head distinguish it readily. The head is about as wide as high; width of the frons is 0.61 times width of the head, 1.27 times height of the eye. The

antennae are wholly brown, the coxae black, femora light brown, tibiae and tarsi testaceous.

Holepyris subtilis Evans

This species was described from Costa Rica and Panama, with a single female from southern California and a single male from southern Arizona (Evans, 1978). It is a distinctive species, males lacking erect pubescence on the flagellum and having 5 propodeal carinae with two shorter carinae laterad of these. Females are one of only two American species lacking a transverse pronotal carina; the frons is unusually narrow, the minimum width in this instance only 0.70 times the eye height; the antennal scape is fully 6.5 times as long as thick. Three males from sites 1 and 3 and a female from site 2 represent a major range extension for this species.

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